

REMARKS

The Examiner's Action mailed on March 21, 2007, has been received and its contents carefully considered.

In this Amendment, Applicant has editorially amended the specification, amended the title of the invention, and amended claim 1. Claim 1 is the independent claim. Claim 1 remains pending in the application. For at least the following reasons, it is submitted that this application is in condition for allowance.

The Examiner's Action has rejected claim 1 as being obvious over *Gi* (USP 4,463,203). It is submitted that this claim is clearly patentable over the cited reference for at least the following reasons.

Amended claim 1 is directed to a method for utilization of rubber wastes with simultaneous performance of pyrolysis of coal in cells of a coke oven battery. Each cell of the coke oven battery is filled with a previously prepared and disintegrated blend of coking coals. This claim specifies the step of adding a rubber granulate in the form of a rubber grain of a size of particles 0.1 - 0.5 mm in an amount of 1 - 5 % by weight, to each charge of the blend of coking coals of a size of particles 0.1 - 0.5 mm in an amount of 95 - 99 % by weight. This claim further specifies the step of thickening a composition of the coking coals and the rubber grain, by mechanical compacting until a uniform structure of a whole charge is obtained. Amended claim 1 further specifies the step of performing a process for utilization of rubber wastes in a closed system without access to oxygen, at a temperature of at least 900 °C with a simultaneous pyrolysis of coal. These steps of the claimed invention decrease the emission of harmful products and the degradation of the natural environment, and enable recovery of carbon

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derivatives which can be reused for the production of rubber articles. These features of the claimed invention are not disclosed, suggested, or taught by the cited reference.

Gi is directed to a process for the preparation of fuel oil, fuel gas and pyrolysis coke. *Gi* discloses a powdered mixture including waste rubber (24.2 parts), synthetic resin (24.2 parts), brown coal (48.5 parts) and bentonite (3.1 parts) (see *Gi*, at col. 4, lines 48-52). However, this powdered mixture disclosed by *Gi* does not have or suggest the inclusion of a rubber granulate in the form of a rubber grain of a size of particles 0.1 - 0.5 mm in an amount of 1 - 5 % by weight, in each charge of the blend of coking coals of a size of particles 0.1 - 0.5 mm in an amount of 95 - 99 % by weight, required by amended claim 1.

The weight ratio of the waste rubber to the brown coal disclosed by *Gi* is 1/2 (i.e., 24.2 parts / 48.5 parts), whereas, in amended claim 1, the weight ratio of the rubber granulate to the coking coal is between 1/99 (i.e., 1% / 99%) and 5/95 (i.e., 5% / 95%).

Moreover, *Gi* does not disclose, suggest, or teach anything about the particle size of the waste rubber or the brown coal. The Examiner considers that it would have been obvious to modify *Gi* to use a particle size, including particles as claimed, which could be effective for pyrolysis reactions. However, *Gi* specifies that an upper part of a turbulence bed consists of sand, alumina and other materials with a diameter 1 mm, which facilitates the progress of the pyrolysis (see col. 1, lines 49-52). Thus, the particle size effective for pyrolysis reactions disclosed by *Gi* is 1 mm, whereas the particle size of the rubber grain and the coking coals recited in amended claim 1 is 0.1 - 0.5 mm. Accordingly, *Gi* does not disclose, suggest, or teach the step of adding the

rubber granulate to each charge of blend of the coking coals, as recited in amended claim 1.

Further, *Gi* does not disclose, suggest, or teach the step of thickening a composition of the coking coals and the rubber grain by mechanical compacting as recited in amended claim 1. The Examiner equates the mixing of the rubber, synthetic resin, brown coal, and bentonite (see col. 4, lines 50-52) with the mechanical compacting recited in amended claim 1. However, simple mixing of the four components disclosed by *Gi* does not disclose anything about the thickening of the mixture until a uniform structure of a whole charge is obtained, as recited in claim 1.

Further, *Gi* does not disclose, suggest, or teach the step of performing a process for utilization of rubber wastes in a closed system without access to oxygen, at a temperature of at least 900 °C with a simultaneous pyrolysis, as recited in amended claim 1. The examiner considers that it would have been obvious to modify *Gi* to use the pyrolysis temperature of 900 °C, because *Gi* discloses, "After exceeding the temperature of 500 °C, the production of tar is hardly present." (see col. 2, lines 38-39). However, *Gi* discloses that the mixture is heated at a temperature of 600 - 700 °C (which is less than 900 °C) in the pyrolysis reactor (see col. 1, lines 13-15). *Gi* further discloses that the gas is produced until the range of pyrolysis temperature of 700-800 °C (which is also less than 900 °C) and that, as the production of gas began to cease, the fuel oil, the fuel gas and the pyrolysis coke at almost ambient temperature are obtained (see col. 4, lines 54-60).

Moreover, the mixture disclosed by *Gi* includes bentonite. Bentonite, zeolyte and other natural substances containing aluminium oxides, e.g., clays, are known catalysts

for cutting the polyolefine chain into shorter particles, such as olefine and parafine oils, olefine and parafine gas, etc. It is also known that a higher temperature, when using a material such as bentonite, causes formation of mostly gaseous substances, thereby requiring the pyrolysis temperature disclosed by *Gi* to be relatively low (i.e., 600-700 °C).

Further, as acknowledged by the Examiner, *Gi* uses synthetic resin and bentonite along with the waste rubber and the brown coal, whereas, in amended claim 1, only the rubber grain is used with the coking coals. The Examiner indicates that the rubber disclosed by *Gi* could be used alone with brown coal without synthetic resin and bentonite. However, *Gi* discloses that the waste synthetic resin, brown coal and at least one other material mixture are added to the feeder 43 (see col. 4, lines 29-31).

Moreover, the bentonite disclosed by *Gi* forms a gel with the melted rubber and resin, and the produced gel adheres with the brown coal (see col. 3, lines 15-20). The use of bentonite therefore is an indispensable feature of the process disclosed by the cited reference, because it enables the objective of the cited reference to be attained, by preventing the degraded material from being coherent on the surface of the reactor (see col. 3, lines 21-23). Accordingly, *Gi* does not disclose, suggest, or teach the rubber grain which is used alone with the coking coals.

It is thus submitted that amended claim 1 is *prima facie* patentable over the cited reference. Accordingly, claim 1 should be allowed and the rejection be withdrawn.

It therefore is submitted that this application is in condition for allowance and such a Notice, with allowed claim 1, earnestly is solicited.

Should the Examiner feel that a conference would help to expedite the prosecution of the application, the Examiner is hereby invited to contact the undersigned counsel to arrange for such an interview:

Respectfully submitted,

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Date



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